

INFORMATION PROCESSING SYSTEM, INFORMATION PROCESSING
METHOD AND PROGRAM

BACKGROUND OF THE INVENTION

5 The present invention relates to a technology of
automating operation steps of a system.

 An automating scheme of operation steps in a computer
or in an information system including the computer, has
hitherto involved the use of a script as the case might
10 be. In the script-guided automating scheme of the
operation steps, at first, the script is created in a way
that matches with a target system, and therefore the script
is individually created corresponding to the target system
or target operation steps. Further, a test suited to the
15 target system is also needed.

 Known as the inventions of this category are
technologies disclosed in, e.g., Japanese Patent
Laying-Open Publication No.11-143701, Japanese Patent
Domestic Laying-Open Publication No.2001-524231,
20 Japanese Patent Laying-Open Publication No.2002-99411
and so on.

 Japanese Patent Laying-Open Publication
No.11-143701 discloses a method of structuring a scenario
for specifying system behaviors in a high-availability
25 system configured by a plurality of servers. According
to this technology, however, parameter settings are
utilized for creating the scenario defined as a final

result product. Therefore, the parameters etc are fixed with respect to the created scenario itself.

The technology disclosed in Japanese Patent Domestic Laying-Open Publication No.2001-524231 provides a user
5 interface (UI) on the basis of a device for providing options and a device that displays to a user the options provided from the option providing device and prompts the user to select the option. This UI is created based on an HTML (HyperText Markup Language) script.

10 The system disclosed in Japanese Patent Laying-Open Publication No.2002-99411 is applied to a program running on a plurality of computer connected to each other via a communication line. This system generates program data and utilizes a setting file for creating the program data.

15 The prior arts given above, however, do not provide a scheme that the computer as a substitute for the user executes the operation steps that should be done by the user. On the other hand, for example, according to Windows98 as an operating system (that will hereinafter
20 be abbreviated to OS) provided by Microsoft Corp., U.S.A., the following automatic install tool is used.

To start with, the user sets a variety of parameters and saves these parameters in a predetermined definition file by utilizing a Window program named Batch98. Then,
25 the user specifies this definition file and starts an install execution program. Then, the computer automatically installs Windows98 from a medium such as

a CD-ROM etc in a way that sets the parameters saved in the definition file. This technique, however, schemes to automate the installation of the OS by specifying the parameters in the install execution program which is one
5 tool of Windows98. Therefore, this technique has no design of saving a labor for the general operations on the computer.

SUMMARY OF THE INVENTION

10 It is a primary object of the present invention, which was devised in view of the problems inherent in the prior arts described above, to provide a technology capable of preventing an operational mistake and reducing a labor and a time necessary for the operation in a system which
15 a repetition of the same or similar operation steps is required of.

To accomplish the above object, according to one aspect of the invention, an information processing system includes a first storage module storing step information
20 containing parameters, a second storage module storing values of the parameters, and a module executing steps specified by the step information in a way that replaces a parameter of the step information with a value of the parameter.

25 Herein, the step information represents, for instance, in the information processing system described above, steps in which the information processing system

executes the same or similar operation instead of the user who should repeat the same or similar operation.

Preferably, the step information may represent steps configuring a predetermined target system by combining
5 a plurality of subsystems, and the parameter may be characteristic information that individually adapts the subsystem to the target system.

Herein, the subsystem is, e.g., a computer program installed into the present information system, hardware
10 incorporated into the present information system, a computer program configuring a part of the present information processing system, and so on.

The scheme that individually adapts the subsystem to the target system implies, for example, that conditions
15 for executing the individual programs are adapted to specifications of the target system.

Preferably, the step information may be encrypted, and the system may further include a module decrypting the step information encrypted.

20 Preferably, the information processing system may further include a module accepting a value setting with respect to the parameter, and a module judging whether the value with the setting accepted can be applied to the target system or subsystem.

25 Herein, the judgement as to whether the value with the setting accepted can be applied to the target system or subsystem, is a judgement of whether the value is

allowable as, for example, the parameter described above.

According to another aspect of the invention, there is provided a method by which a computer or other device or machine executes any one of the processes described
5 above.

According to a further aspect of the invention, there is provided a storage medium recorded with a program executed by the computer or other device or machine to actualize any one of the functions described above.

10 As explained above, the technology according to the present invention prevents the operational mistake and reduces the labor and the time necessary for the operation in the system which the repetition of the same or similar operation steps is required of.

15

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram showing a principle of an information system on one embodiment of the present invention;

20 FIG. 2 is a diagram showing a system architecture of the information system;

FIG. 3 is a diagram showing a structure of a user interface (UI) of the information system;

FIG. 4 is a diagram showing an example of a design
25 sheet 8;

FIG. 5 is a diagram showing an example of design sheet definition data;

FIG. 6 is a diagram showing an example of a setting file 5;

FIG. 7 is a diagram showing example of a script;

FIG. 8 is a flowchart showing a processing flow of the design sheet 8; and

FIG. 9 is a flowchart showing a processing flow of a script engine 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

10 An information system in one embodiment of the present invention will hereinafter be described with reference to FIGS. 1 through 9.

FIG. 1 is a diagram showing a principle of this information system. FIG. 2 is a diagram showing a system architecture of this information system. FIG. 3 is a diagram showing a structure of a user interface (UI) of this information system. FIG. 4 shows an example of a design sheet 8 illustrated in FIG. 3. FIG. 5 shows an example of design sheet definition data that define contents of the design sheet 8. FIG. 6 shows an example of a setting file 5. FIG. 7 shows an example of a script utilized in the present information system. FIG. 8 is a flowchart showing a processing flow of the design sheet 8. FIG. 9 is a flowchart showing a processing flow of a script engine 1.

<Principle of Information System>

FIG. 1 is the diagram showing the principle of this

information system. As shown in FIG. 1, this information system is configured of a script file 4, a setting file 5 for defining values of parameters with respect to the script file 4, and a script engine 1 for reading the script file 4 and the setting file 5, and executing a process specified in the scrip.

The script file 4 is stored with the script. The script is defined as an aggregate of information containing commands analyzed by the script engine 1 and control information that controls an interpretation of the script. The script is the fixed information that can not be changed and is encrypted by a predetermined encryption program.

Each of the commands structuring the script is assigned an operand corresponding to the command. Specific pieces of data such as a character string of a name etc, a numerical value indicating a predetermined quantity and so on, may be designated as an operand of the command. A parameter may, however, be assigned instead of designating the specific data as an operand in the command. A value itself of this parameter may be defined in the setting file 5.

The setting file 5 is a file in which the values of the parameters are defined. The script is the fixed information that can not be changed, whereas the information of the setting file is changeable.

The script engine 1 includes a decryption module 11 for reading and decrypting the encrypted script, a check

module 12 for reading and checking a content of the setting file 5, and an analyzing module 13 for making an analysis in a way that combines the decrypted script with the readout setting file 5.

5 The components of the script engine 1, such as the decryption module 11, the check module 12 and the analyzing module 13, are actualized as a program executable by a computer. The script engine 1, based on a result of the analysis by the analyzing module 13, controls a program
10 (which may be called an external program) other than the script engine 1, or operates the file specified by the script 4.

<System Architecture>

FIG. 2 is the diagram showing a system architecture
15 of the present information system. This information system includes the script engine 1 executed by an unillustrated CPU, the script file 4 read by the script engine 1, the setting file 5 read likewise, a display 2 for displaying the information to a user, a keyboard 3
20 used for the user to input the information, a behavior recording file 6 for recording behaviors of the script engine 1, and an external program 7.

The script engine 1, the script file 4 and the setting file 5 have already been explained referring to FIG. 1.

25 The display 2 queries of the user or prompts the user to do various categories of settings such as inputting an option or a value and so forth, by displaying pieces

of information such as images, menus, icons etc to the user. The user inputs the information through the keyboard 3 in response to the query.

The behavior recording file 6 is a so-called log
5 file and is stored with a record of the behaviors of the script engine 1.

The script engine 1 starts the external program 7. Further, the script engine 1 transmits information such as events etc or messages to the on-the-run external
10 program 7.

An outline of the processing of the script engine 1 will be described with reference to FIG. 2. The script engine 1 at first reads a content of the script file 4 and the setting file 5 corresponding to the script file
15 4 ((arrow (1), (2) in FIG. 2).

Further, in an example shown in FIG. 2, the script engine 1 queries of the user through on the display 2 (arrow (3) in FIG. 2).

The user confirms the content of the setting and
20 inputs a new piece of information or changes the setting (arrow (4) in FIG. 2). When the new information is inputted or the setting is changed, as shown in FIG. 1, a check of the setting file 5 is executed.

The script engine 1, when given the script file 4
25 and the effective setting file 5, sends an operation, e.g., an event to the external program 7 (arrow (5) in FIG. 2), or starts the external program 7 (arrow (6) in FIG. 2).

A result of these operations are written as a record of behaviors to the behavior recording file 6 (arrow (7) in FIG. 2).

FIG. 3 is the diagram showing a structure of the user interface (UI) of the present information system. This information system is provided with the design sheet 8 as the UI for setting the information in the setting file 5. The design sheet 8 can be actualized by, e.g., a spreadsheet etc and serves to guide the information setting by the user.

The design sheet 8 checks a content set by the user and, if a checked result is correct, stores the setting file 5 with this piece of information.

Hence, according to the present information system, the user is guided by the design sheet 8 to check that conditions necessary for use together with the script are prepared (arrow (1) in FIG. 3), and thereafter the inputted information can be written to the setting file 5 (arrow (2) in FIG. 3).

FIG. 4 shows an example of the design sheet 8. In this embodiment, the design sheet 8 has a "name of item" field, an "entry" field and an "explanation/entry example" field. The name of item is a name representing a category of the information set in this item.

Further, the user sets a value of this item in the entry field. For example, if "selection of pen or pencil" is entered in the "name of item" field, the user sets a

character string of "pen" or "pencil" in the "entry" field. Moreover, if the name of item is "first name", the user sets a user name in the "entry" field. Further, if the name of item is "last name", the user sets a family name
5 of the user in the "entry" field. An explanation of the content that should be set in each item, a setting example etc, are shown in the "explanation/entry example" field.

According to the present information system, when the design sheet 8 writes the set data to the setting file
10 5, the design sheet 8 checks the content of the setting file 5. Thus, the user can correct an error with the aid of the design sheet 8 by performing the check in the process of creating the setting file 5 from the design sheet 8.

<Data Example>

15 FIG. 5 shows an example of design sheet definition data for defining the content of the design sheet 8. The design sheet definition data has, in addition to the "name of item" field, the "entry" field and the "explanation/entry example" field which are displayed in
20 the design sheet 8 shown in FIG. 4, further a "name of parameter" field, an "extension area" field, a "check" field and an "output file " field.

A name of items displayed in the design sheet 8 is defined in the "name of item" field of the design sheet
25 definition data. Further, the "entry" field of the design sheet definition data is stored with the information (the value etc) set in the "entry" field of the design sheet

8.

The data in the "explanation/entry example" field displayed in the design sheet 8 is defined in the "explanation/entry example" field of the design sheet definition data. A name of parameter of which a value is set when outputting the value in the "entry" field of each item to the setting file 5, is defined in the "name of parameter" field. For example, when "PEN_PENCIL" is defined in the "name of parameter" field and when "pencil" is inputted to the "entry" field, PEN_PENCIL = pencil is outputted to the setting file 5. The parameter of which the value is set, is specified by this name of parameter,

If the data in the "entry" field needs executing of a special process, a program etc that executes this process is specified in the extension area. For instance, this is a case where the data in the "entry" field is segmented into a plural pieces of data and values are set in a plurality of areas of the setting file 5. Further, that is a case where the plurality of values set in the "entry" field are combined and thus synthesized into one piece of data.

A check mode for checking the information inputted in the "entry" field, is defined in the "check" field. In a record specified by, for instance, the item name of "selection of pen or pencil", if neither "pen" nor "pencil" is entered as a value in the "entry" field, an error is detected according to the specification of the check mode

"{pen, pencil}". Further, in a record specified by e.g., the item name of "first name" etc, a definition of being a character string, a limit in character count etc are designated.

5 FIG. 6 shows an example of the data in the setting file 5. This example shows that a value "pencil" is set in a parameter PEN_PENCIL, a value Keisuke is set in a parameter FIGSTNAME, a value Yoshida is set in a parameter LASTNAME, and a value d is set in a parameter DRIVE.

10 FIG. 7 shows an example of the script utilized in the present information system. In this example, a program (a text editor) named "notepad" is started (L1) and, after an interval of a 1-sec standby time (L2), a value transferred to this text editor is defined (L3).

15 Among those values, "This", "[SPACE]", "is" etc are values specifically designated within the script, while \$[PEN_PENCIL]" etc is a parameter defined in the setting file 5.

 Referring to FIG. 7, "Memorandum Untitled" is
20 defined as a title of a window in which the text editor is displayed. The script engine 1 transfers those values to a program that displays a window title named "Memorandum Untitled".

 Moreover, according to the definitions in FIG. 7,
25 the data transferred to the text editor are saved in a predetermined file (text00.txt) (L4), and the window is changed into a window title named "text00.txt-memorandum",

i.e., the one containing a text file stored with the data of the text editor (L5).

The script in this embodiment is capable of designating an execution of a plurality of programs. The example in FIG. 7 shows that the text editor is further
5 started (L7), after there is a 1-sec wait (L8), the data are transferred also to the text editor started second time (L9), the data of the text editor are saved (L10), and then a change of the window title is designated (L11).
10 Thus, the operation steps executed repeatedly are described in the script, whereby a user's labor for the operations can be saved.

The script may, however, be described in the way not that the same program is started twice as illustrated
15 in FIG. 7 but that a plurality of different programs are started. Further, the script may be described so that an event is transmitted to the already-running program.

<Operation>

FIG. 8 shows a processing flow of the design sheet
20 8. The design sheet 8 is structured of, e.g., a spreadsheet. To start with, the design sheet 8, when started, based on a designation by the user, reads the definitions in the design sheet (see FIG. 5), and displays a sheet (table) concerned (S11).

25 Next, the design sheet 8 comes to a standby status for an event (S12). When the event occurs, the design sheet 8 judges whether the event is an input of information

from the user (S13).

If the event is the information input from the user, the design sheet 8 displays an input content on the sheet (S14). Thereafter, the design sheet 8 returns the control
5 to S12.

Whereas if the event is not the information input from the user, the design sheet 8 judges whether the event is a user's indication of output to the setting file 5 (S15). If the event is not the user's indication of output
10 to the setting file 5, the design sheet 8 makes the control loop back to S12.

If the vent is the user's indication of output to the setting file 5, the design sheet 8 checks a content of the setting (S16). Then, if an error exists in the
15 setting content, the design sheet 8 prompts the user to correct the error. Then, the design sheet 8 outputs the corrected setting content to the setting file 5 (S17). Thereafter, the design sheet 8 terminates the processing.

FIG. 9 shows processes of the script engine 1. The
20 script engine 1, when a script file 4 is specified, starts a process. In this process, the script engine 1 at first reads a next record from the script file 4 (S20).

Then, the script engine 1 judges whether the record exists in this script file 4 (S21).

25 If the record exists in the script file 4 concerned, the script engine judges whether this record is a record for commanding to start a program (S22). If this record

commands to start a program, the script engine 1 starts the designated program (S23). Then, the script engine 1 returns the control to S20.

If the above record is not the record that commands
5 to start a program, the script engine 1 judges whether this record is a record for commanding an operation upon a program (S24). If this record is the record commanding an operation upon a program, the script engine 1 executes a designated operation upon the program specified by this
10 record (S25).

Herein, the operation upon the program is, for example, a transfer of the character string to the text editor, a transfer of an install parameter for executing an installation of a program, a transmission of an event
15 upon a wait-for-event program, and a designation of each of system parameters (such as device definition information, address definition information, user definition information, access management information to the file, a limit in memory space etc) given to a system
20 management program. Thereafter, the script engine 1 makes the control loop back to S20.

If the above record is not the record commanding the operation upon the program, the script engine 1 judges whether this record is a record for controlling the script
25 engine 1 itself (S26). If this record is the record for controlling the script engine 1 itself, the script engine 1 executes a control process as specified by this record

(S27) .

Herein, the control of the script engine 1 itself includes, for instance, waiting for a time of the designation, shifting of a reading position to the
5 predetermined record (which is a so-called branch instruction) within the script file 4, judging whether a predetermined condition is given or not, repeating a predetermined process and so on. Thereafter, the script engine 1 returns the control to S20.

10 When judging in S26 that the record concerned is not the record for controlling the script engine 1 itself, the script engine 1 executes other process (S28) . Other process is, e.g., a process of skipping though a comment described in the script. Thereafter, the script engine
15 1 returns the control to S20.

When judging in S21 that there is no next record in the script file, the script engine 1 terminates the process with respect to this script file 4.

As discussed above, according to the present
20 information system, the operation can be executed in the form adapted to a target system depending on the content set in the setting file 5 in a way that uses the general-purpose script.

For example, in the case of configuring the system
25 by use of a plurality of subsystems on the computer, the following operations need repeating.

(1) Install the subsystem (e.g. a program) .

(2) Set execution conditions (such as an execution timing, an execution time, an execution count etc) or execution environments (such as a capacity of a main memory to be utilized), a disk capacity, conditions of peripheral
5 devices, access control and so forth) of this subsystem.

(3) The above operations (1) and (2) are repeated the same number of times as a predetermined number of subsystems.

(4) The operations (1) through (3) are repeated the
10 same number of times as a predetermined number of computers. In this case, the execution conditions or the execution environments etc are changed for every computer as the necessity arises.

According to the present information system, the
15 setting file 5 is stored with the set values that needs to be changed depending on the target system, and the system configuring steps for the plurality of target system can be shared in common by one script. Therefore, the operations (1) through (4) described above can be executed
20 by the computer in accordance with the common general-purpose script.

Moreover, the operation steps can be concealed by encrypting the script file, and the operation for the system can be executed without disclosing the detailed
25 operation steps.

Further, the information set in the thus-structured setting file 5 is inputted via the design sheet 8. The

design sheet 8, before outputting the inputted or changed information to the setting file 5, confirms a compatibility with the target system. Accordingly, the user can check the setting content before the computer is made to actually
5 execute the script.

<Modified Example>

According to the embodiment discussed above, the design sheet 8 is structured of the program, e.g., the spreadsheet, different from the script engine 1. The
10 embodiment of the present invention is not, however, limited to this structure. For example, the design sheet 8 may be structured as a program integral with the script engine 1. Further, the design sheet 8 may also be structured as an application program cooperating with the
15 script engine 1.

<Storage Medium Readable by Computer and Other Devices and Machines >

A program executed by a computer to actualize any one of the functions described above may be recorded on
20 a storage medium readable by the computer etc. Then, the computer reads and executes the program on this storage medium, thereby providing the function thereof.

Herein, the storage medium readable by the computer etc. includes recording mediums capable of storing
25 information such as data, programs, etc. electrically, magnetically, optically and mechanically or by chemical action, which can be all read by the computer. What is

demountable out of the computer among those storage mediums
maybe, e.g., a floppy disk, a magneto-optic disk, a CD-ROM,
a CD-R/W, a DVD, a DAT, an 8mm tape, a memory card, etc.

Further, a hard disk, a ROM (Read Only Memory) and
5 so on are classified as fixed type storage mediums within
the computer.